

Exercises to the lecture  
Concurrency Theory  
Sheet 9

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Delivery until 24.06.2014 at 12h

**Exercise 9.1**

Given a finite domain  $D$ , show that every irreflexive partial order  $<\subseteq D \times D$  can be extended to a total order on  $D \times D$  that includes it.

**Exercise 9.2**

Prove that overwritten write elimination and write after read elimination as given in the lecture notes are valid in C11 without RLX accesses.

Note that to *eliminate* an event means to replace it by skip.

**Exercise 9.3**

State conditions under which inserting a redundant write before another write is a valid compiler optimization in C11 without RLX accesses:

$$\text{skip}; C; X_{\text{NA}} = 1 \quad \rightsquigarrow \quad X_{\text{NA}} = 1; C; X_{\text{NA}} = 1$$

Prove that your conditions are correct and show that they are necessary.

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